

WE CLAIM:

1 1. An ultrasound system comprising:  
2 a scan head having a plurality of ultrasound transducer elements for producing ultrasound  
3 beams;  
4 a first subset of the plurality of ultrasound transducer elements for producing a first  
5 ultrasound beam;  
6 a second subset of the plurality of ultrasound transducer elements, that is displaced by  
7 more than one transducer element from the first subset, and for producing a second  
8 ultrasound beam;  
9 a third subset of the plurality of ultrasound transducer elements, that is displaced by more  
10 than one transducer element from the second subset, and for producing a third  
11 ultrasound beam; and  
12 a transmit switch for coupling the plurality of ultrasound transducer elements to a beam  
13 transmitter;  
14 wherein, the second subset is the only subset of the plurality of ultrasound transducer  
15 elements operative between a time the first subset is operative and a time the third  
16 subset is operative.

1 2. The system of claim 1, wherein the second subset differs in position from both the first  
2 subset and the third subset by at least fifty percent of the number of transducer elements  
3 in the second subset.

1 3. The system of claim 1, wherein the second subset is disjoint with respect to both the first  
2 subset and the third subset.

1 4. The system of claim 1, wherein the center of the first subset is displaced from the center of the  
2 second subset by a distance greater than or equal to the width of two ultrasound  
3 transducer elements in the plurality of ultrasound transducer elements, and the center of  
4 the second subset is displaced from the center of the third subset by a distance greater  
5 than or equal to the width of two ultrasound transducer elements in the plurality of  
6 ultrasound transducer elements.

1 5. The system of claim 1, wherein the second subset overlaps the first and third subsets by  
2 amounts less than thirteen percent of the width of the second subset.

1 6. The system of claim 1, wherein the second subset overlaps the first and third subsets by  
2 amounts less than thirty-four percent of the width of the second subset.

1 7. The system of claim 1, wherein the second subset overlaps the first and third subsets by  
2 amounts less than eighty-seven percent of the width of the second subset.

1 8. The system of claim 1, wherein the transmit switch includes outputs coupled to the plurality of  
2 ultrasound transducer elements and inputs coupled to the beam transmitter, the number of  
3 inputs being fewer than the number of outputs.

1 9. The system of claim 1, wherein the transmit switch includes outputs coupled to the plurality of  
2 ultrasound transducer elements and inputs coupled to the beam transmitter, the number of  
3 inputs being fewer than the number of outputs and each of the outputs being alternatively  
4 coupled to less than eight of the inputs.

1 10. The system of claim 1, further including an image scan converter for generating first data  
2 using the first subset and generating second data using the second subset, the first data  
3 and the second data being used to form an image.

1 11. The system of claim 1, further including an image scan converter for generating first data  
2 using the first subset and generating second data using the second subset, the first and  
3 second data being used to form an image with a resolution independent of the number of  
4 ultrasound transducer elements common to the first subset and the second subset.

1 12. The system of claim 1, wherein the ultrasound transducer elements included in the second  
2 subset are disposed in a linear array.

1 13. The system of claim 1, wherein the ultrasound transducer elements included in the second  
2 subset are disposed in a curvilinear array.

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1 14. The system of claim 1, further comprising computer code for calculating a cross-correlation  
2 between first data generated using the first subset and second data generated using the  
3 second subset.

1 15. The system of claim 1, further comprising computer code for calculating a cross-correlation  
2 between less than fifty percent of first data generated using the first subset and less than  
3 fifty percent of second data generated using the second subset.

1 16. The system of claim 1, further comprising computer code for calculating a cross-correlation  
2 between less than thirty-four percent of first data generated using the first subset and less  
3 than thirty-four percent of second data generated using the second subset.

1 17. An ultrasound imaging method comprising the steps of:  
2 directing three consecutive ultrasound beams into a material under investigation, the three  
3 ultrasound beams including,  
4 a first ultrasound beam,  
5 a second ultrasound beam overlapping with the first ultrasound beam by less than  
6 eighty-seven percent of the width of the second ultrasound beam, and  
7 a third ultrasound beam overlapping with the second ultrasound beam by less than  
8 eighty-seven percent of the width of the second ultrasound beam;  
9 detecting echoes generated by each of the three consecutive ultrasound beams; and  
10 generating two-dimensional echo location data using the detected echoes.

1 18. The method of claim 17, wherein the two-dimensional echo location data is generated using  
2 area-forming.

1 19. The method of claim 17, further including a step of generating an image using the two-  
2 dimensional echo location data.

1 20. The method of claim 19, wherein the image resolution is independent of overlaps between  
2 the first, second, and third ultrasound beams.